

Atty Dkt. No.: 10003512-1  
USSN: 09/771,092

### REMARKS

In view of the following remarks, the Examiner is respectfully requested to withdraw the rejections and allow Claims 1-14 and 35-42, the only claims pending and currently under examination in this application.

### REJECTION UNDER 35 U.S.C. §103

Claims 1-14 and 35-42 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Bares et al. (U.S. Patent No. 5,023,625) in view of Ford et al. (U.S. Patent No. 6,045,759).

In making this rejection, the Examiner asserts that Bares teaches all of the elements of the claimed invention but for the element of striking the pulse jet. For this element, the Examiner looks to Ford.

With regard to rejections based on obviousness, the MPEP at § 2142 states:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As will be demonstrated below, the Examiner's *prima facie* case is deficient because there is no motivation to combine the references because they are in non-analogous art; and any motivation that is present is solely based on the applicant's disclosure.

As summarized above, the references are improperly combined because they are from non-analogous art. With respect to non-analogous art, the MPEP at § 2141 states:

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"In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992) ("A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem."); \* *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993)>; and *State Contracting & Eng'g Corp. v. Condotte America, Inc.*, 346 F.3d 1057, 1069, 68 USPQ2d 1481, 1490 (Fed. Cir. 2003) (where the general scope of a reference is outside the pertinent field of endeavor, the reference may be considered analogous art if subject matter disclosed therein is relevant to the particular problem with which the inventor is involved).

The Applicant respectfully submits that Ford is not a proper reference because it is non-analogous art.

The field of the Applicant's invention is related to drop deposition from a pulse-jet, e.g. for microarray fabrication. The field of the Ford reference has no association with microarray fabrication or pulse-jet devices. Instead, Ford is related to histological diagnosis and the study of tissue morphology. The fluid dispensers disclosed by Ford are very similar to an automatic pipette. The teaching of using the Ford apparatus has nothing whatsoever to do with microarray fabrication. According to the Ford disclosure, the automated dispenser aliquots reagent onto a microscope slide that typically has a tissue section or a population of cells already fixed on it. However, the dispenser is taught as dispensing a volume of liquid necessary to completely cover the sample but in no way fabricates an array of chemical moieties on a substrate surface. Therefore, one of ordinary skill in the art of microarray fabrication with a pulse-jet would not have looked to a reference directed to histological assays with a pipette type dispenser when devising the Applicant's invention.

The present invention solves a problem observed by the Applicant in the field of using pulse-jets for microarray fabrication. Specifically, the present invention solves a problem with bubbles forming in a chamber of the pulse-jet, blocking an orifice, and thereby causing problems with fluid dispensing, where the problem is solved by the solution devised by the

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Applicant, i.e., to strike the pulse-jet to dislodge the bubble.

The Ford reference is not reasonably pertinent to the problem of unreliable drop dispensing of a pulse-jet during microarray fabrication. The Ford invention is directed at solving problems pertaining to its pipette-like dispensing head. Therefore, any problems described in Ford are related to problems of dispensing fluid with a pipette, which is very different from a pulse-jet.

A pulse-jet utilizes a thermoelectric or piezoelectric transducer element in order to eject a volume of fluid through an orifice from a small chamber. In a thermoelectric pulse-jet, an electrical signal to a heating element in a firing chamber causes a bubble to form in the chamber and therefore a drop of fluid to be ejected from the chamber through the orifice. In a similar manner, with a piezoelectric pulse-jet, an electrical signal to a piezoelectric element causes the element to change physical dimensions, thereby ejecting fluid from the chamber through the orifice.

In contrast, the device taught by Ford requires movement of a barrel to dispense a volume of fluid. Specifically, in the fluid dispenser of Ford, application of downward mechanical force on the barrel expels a predetermined amount of fluid from a dispenser chamber of the dispenser. See Col. 22, lines 28 to 40.

As such, dispensing fluid using a thermoelectric or piezoelectric ejector, as is done in a pulse-jet, is very different from applying mechanical pressure on a barrel element of a pipette to expel a volume of liquid from a dispenser chamber of the pipette.

Therefore, because of the significant structural and use differences between pulse-jets and automatic fluid dispensing devices as taught by Ford, one of ordinary skill in the art would not look to a reference such as Ford to solve a problem being experienced with pulse-jets.

In asserting that one of skill in the art would modify the teaching of Bares by the

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teaching of Ford to arrive at the claimed invention, the Examiner appears to assume that because both disclosures relate to dispensing fluid, any solutions taught by Ford are applicable to the present invention. At page 5 of the Office Action, the Examiner states: "It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bares et al by employing the teachings of Ford et al. and striking or tapping the syringe to remove bubbles in order to provide for accurate and precise dispensing of fluids."

However, one of skill in the art would not be motivated to modify the primary Bares patent with the teaching of Ford in the manner suggested by the Examiner because, as discussed above, the differences between pulse-jets and the fluid dispenser of Ford are so great that one of skill in the art would not consider looking at the Ford patent for a solution to a problem being experienced with pulse-jet devices. Since the claims are in no way directed to the dispensing of fluids from syringes (nor indeed is the invention of Bares), the teachings of Ford are simply not relevant.

The Examiner has provided no motivation in the cited references to modify the primary teaching of Bares in view of the teaching of Ford. Instead, the Examiner has looked solely to the Applicant's disclosure to obtain this motivation. As reviewed above, for a proper combination of references, the motivation to combine must not reside solely in the Applicant's disclosure.

Therefore, as demonstrated above, the references have been improperly combined because at least the Ford reference is non-analogous art to the claimed invention and there is no motivation in the art to combine and modify the teachings of the references as asserted by the Examiner. For at least this reason, the rejection may be withdrawn.

Additionally, with respect to dependent Claim 2, as well as Claims 11, 39 and the claims dependent thereon, the combined teachings of the cited references fails to teach or suggest all of the limitations of the claimed invention of these claims.

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Turning to Claims 11, 39, and their dependent claims, these claims are directed to fabricating arrays of chemical moieties.

For example, Claim 11 reads:

A method of fabricating an **array of chemical moieties on a substrate**, comprising:  
dispensing drops from a pulse jet onto the substrate so as to form the **array**; and  
intermittently striking the pulse jet multiple times;  
wherein the pulse jet comprises a chamber and a thermoelectric or piezoelectric ejector in the chamber.

Bares fails to teach or suggest using a pulse-jet to fabricate arrays. Ford is directed to automatically dispensing fluids onto a slide, e.g., in an automatic immunostaining system. Col. 8, lines 48 to 50. According to Ford's method, the dispenser is used for histological diagnosis and the study of tissue morphology. The dispenser of Ford is used to automatically aliquot a single volume of reagent to cover an entire sample already fixed onto a microscope slide. However, nowhere does Ford provide that the dispenser may be used to fabricate arrays of chemical moieties. As such, neither Ford nor Bares teach or suggest a method of fabricating arrays of chemical moieties.

Accordingly, since none of the references teach or suggest the a method of fabricating arrays of chemical moieties, Claims 11, 39, and their dependent claims which are directed to methods of fabricating arrays of chemical moieties are even further distinguished from the cited combination of Ford and Bares.

Furthermore, Claims 2, 11 and the claims dependent thereon include the feature of intermittently striking the pulse-jet multiple times. Ford teaches: "To check for a good prime, the customer may flip the dispenser upside-down, tap the dispenser, dislodging...." Nowhere does Ford teach or suggest striking the dispenser, much less a pulse-jet, intermittently multiple times.

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As such, these claims are further distinguished from the cited combination of references.

In view of the foregoing discussion, Claims 1-14 and Claims 35-42 are not obvious under 35 U.S.C. § 103(a) over Bares in view of Ford and this rejection may therefore be withdrawn.

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### CONCLUSION

The Applicant submits that all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone Dianne Rees at 650 485 5999.

The Commissioner is hereby authorized to charge any underpayment of fees associated with this communication, including any necessary fees for extensions of time, or credit any overpayment to Deposit Account No. 50-1078.

Respectfully submitted,  
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